

- Reward excellence.
- Sustain a quest for excellence.

The commander is the standard-bearer. He builds trust, and trust is founded on integrity. His physical, moral, and spiritual values express a keen sense of human worth and fairness. These virtues demonstrate devotion to the welfare of his comrades—superiors, peers, and subordinates alike—and his actions affirm a selflessness that puts duty above all personal concerns.

In conclusion, the commander has at least three major ethical responsibilities:

First, he must *be the role model* for integrity in physical, moral, and spiritual values. These values promote enthusiasm, disciplined leadership, and effective decision-making. To the best of his ability, he highlights a fundamental rule of treating soldiers and leaders as he would like to be treated.

Second, the commander must *train his leaders*. He develops subordinates ethically and demonstrates initiative, risk-taking, and leadership with his professional actions. This teaches his subordinates to make effective decisions and stand behind them. In doing so, he motivates his subordinate leaders—as simply stated by my command sergeant major near the demilitarized zone in Korea—with how to “do the right thing!”

Finally, the commander must *demonstrate moral and physical courage*. Of course, there is no magic potion for courage, but he will set the example through effective tactical decision-making and leadership. These focus the cumulative combat power of his command on a clearly stated objective. He ensures that each member of the command knows the mission and its importance in the context of the larger tactical operation. This concentrated

effort toward successful engagement must support the intent—purpose and end-state—of the commander.

Embracing the core values of courage, candor, competence, and commitment cements the leaders’ and soldiers’ trust and compelling desire to accomplish a mission with a clear understanding of their commander’s intent, and the means to this end is a clear, well-articulated command philosophy.

Lieutenant Colonel Jon H. Moilanen commanded the 2d Battalion, 2d Armor, in Korea and is now assigned to Readiness Group Snelling, in Minnesota. He previously served with the 3d Armored Cavalry Regiment, 1st Cavalry Division, 3d Armored Division, and 2d Infantry Division and taught tactics and logistics in the U.S. Army Command and General Staff College’s Army Tactics and Tactical Commanders Development Course. He is an ROTC graduate of the University of Wisconsin-Oshkosh and holds a master’s degree from Indiana University of Pennsylvania.

The GPS

And the Lost Art of Land Navigation

MAJOR BRICE H. JOHNSON

The global positioning system (GPS) is the device I dreamed about when I was an infantry lieutenant conducting day and night movement. I first used this system as a company commander during Operations DESERT SHIELD and DESERT STORM, and it proved invaluable. I was able to locate the division command post and find water points and mobile resupply points during periods of limited visibility. This was no small feat in terrain that was mostly nondistinctive and included an extensive area of operation.

Nevertheless, with GPS technology now a standard item in most units, we must be aware of some common pitfalls

that can be avoided only by applying common sense that is rooted in sound land navigation and terrain association skills.

When I was assigned as officer in charge of night record land navigation at the United States Military Academy, the course was already established. The points on the course were positioned using a 1:10,000-scale orienteering map that is quite accurate. Each location on that map was then converted to an eight-digit coordinate for use with the 1:50,000-scale topographic map of West Point and vicinity, the one cadets must use in negotiating the course.

When I asked about any problems

with the site, the previous officer in charge indicated that a few of the points had been frequently questioned. Because all cadets must negotiate this course and receive a “GO” as an MQS (military qualification standard) requirement for commissioning, and because of my previous experience in dealing with disputed locations and grid coordinates, I decided to verify the points using GPS differential positioning technology.

Routine GPS positioning is accomplished when the receiver is able to read three or more satellites. The time it takes a satellite signal to reach the receiver is converted to a distance. By

comparing its distance from three or more satellites, the receiver can calculate its position on the Earth's surface. A greater number of satellites involved in the calculation increases the accuracy of the determined position. Differential positioning involves using two receivers at the same time. One, designated the base station, is surveyed to a known location. The second, designated the rover or mobile unit, is then taken to points that are to be differentially located. Both receivers take satellite readings simultaneously. Because the base station's location is known, errors in the GPS readings are added or subtracted to correct the GPS grids. These same corrections, as a function of time, are then applied to the readings taken by the mobile receiver. Several hundred readings are taken at each point. The mathematically corrected rover grids are then averaged. Depending on the receiver used and on the number of readings taken, the differentially corrected grids can be accurate to less than a meter.

The equipment required includes a base station, a computer, a mobile receiver, and software that is capable of running the required algorithms.

To accomplish my tasks, all I had to do was go to 28 points of the course (each point was a tree marked with paint and luminous tape) and take approximately 100 readings at each point. The relative degree of accuracy dictates how many readings are necessary at each point. Taking 100 at each point

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would give me an accuracy of plus or minus two meters from the actual location. This was more than enough, since the cadets are given eight-digit grid coordinates that are accurate only to plus or minus 10 meters. Next, I subtracted the error from the readings, then

averaged all the corrected readings for each point. Some rounding was necessary as the GPS coordinates were the equivalent of 10-digit grids with decimals to three significant figures. The corrected, averaged, and rounded coordinates were now accurate within the 10-meter range of an eight-digit grid coordinate.

The average distances between the old coordinates and those generated by GPS differential positioning was 64 meters. Three of the 28 grids were correct, with the greatest difference at 180 meters. When I plotted the GPS differential positioning coordinates on the 1:50,000 map sheet of West Point and vicinity, I observed a few minor problems:

Because of cartographic requirements, roads, man-made features, and other geographic features are not always accurate. Furthermore, the width of a line drawn on a 1:50,000-scale map with a fine-point pencil represents approximately 50 meters on the ground. In addition, based on my survey of the land navigation course, the very accurate GPS differential positioning coordinates could be misleading when plotted. Examples include points physically located on hill tops with GPS-generated coordinates that—when plotted on a map—are actually not on the hill top and other GPS-generated coordinates for points located near course boundaries that, when plotted, fall on a side of the boundary other than that indicated by the map.

The moral of my story is threefold:

First, as with all technological advancements, GPS should not be used blindly; its accuracy must be understood in relation to mapping accuracy. Imagine navigation in such featureless terrain as that of western Iraq, and contrast it with navigation at such places as West Point, New York, where there are many distinctive terrain features and human-engineered features. GPS grids would be ideal for navigation in the first instance but might be too accurate for navigation in the latter.

Next, GPS is a wonderful addition to

the arsenal of technical aids now available. It provides information at previously unattainable speeds and to previously unattainable levels of accuracy. Such information could include your location, azimuths and distances

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to objectives, and the range and deflection to other locations.

Finally, as infantry leaders, we must temper this wonderful technology with common sense that is rooted in competent land navigation and terrain association skills. The next time you position a target reference point, a passage point, or an obstacle—or send a net call asking all squad leaders, platoon leaders, or company commanders to meet you at a location you have determined using GPS technology—make sure you have plotted the coordinate on your operational map to see if you are, in fact, where the GPS says you are. Conversely, when you issue an order that involves a grid coordinate, be aware that the coordinate you read off your map and send may be blindly located using GPS technology, even if an adjustment of 50 or 100 meters is logical and would better meet your commander's intent.

No technology will ever replace the need for infantry leaders to understand terrain and to be competent in the art of land navigation, but these skills—when used in conjunction with technological advances such as GPS—will ensure that a commander knows where he and his maneuver units are every time.

Major Brice H. Johnson has served in both heavy and light infantry divisions and commanded HHC, 82d Airborne Division, in theater, during Operations DESERT SHIELD and DESERT STORM. He recently completed an instructor assignment at the United States Military Academy and is now attending the U.S. Army Command and General Staff College. He is a 1983 graduate of the Academy and holds a master's degree from the University of Iowa.
